THE [18.1], [18.6] and [18.7] EXCITED STATES OF YTTERBIUM FLUORIDE

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The generation of a fountain of laser-cooled ytterbium fluoride, YbF, has been recently proposed[a] as a method for long coherent observation times, thereby improving the electron electric dipole moment (eEDM) measurement. Understanding the properties of the excited electronic states of YbF is essential for the development of such a scheme for laser cooling. Here we report on the measurement of the radiative lifetimes,τ, permanent electric dipole moments, μ_{el}, and magnetic g-factors for the [18.6] and [18.7] excited states of YbF. The results are compared with the previously determined values for [18.1] state[bc]. The [18.1] state is the Ω=1/2 spin-orbit component of the A $^2\Pi$(v=0) electronic state arising from the $Yb^+(4f^{14}6p\pi)F^-(2p^{14})$ configuration. The experimentally determined μ_{el}, and g-factors will be used to unravel the nature of the [18.6] and [18.7] states, which are known to be admixtures A $^2\Pi$ and an additional Ω=1/2 state of unknown electronic configuration.

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